PB90-157892

Superfund Record of Decision (EPA Region 3)
New Castle Spill, New Castle, DE
(First Remedial Action), September 1989

(U.S.) Environmental Protection Agency, Washington, DC

28 Sep 89

U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R03-89/077
September 1989

PB90-157892

EPA

Superfund Record of Decision:

New Castle Spill, DE

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The New Castle Spill site is a former manufacturing facility 0.5 mile north of New Castle, Delaware, and is in the 100-year floodplain of the Delaware River. Commercial enterprises and residences neighbor the site and receive potable water from the deeper of the two aquifers underlying the site. The six-acre area associated with the site consists of municipal property, wetlands, and the Witco manufacturing facility which produced plastic foams using (2-chloropropyl)-phosphate. In 1977, because of dead grass near the facility's drum storage area, Witco investigated the area and determined that four to five drums of tris had spilled and contaminated the soil and the shallow aquifer. The State subsequently pumped and discharged contaminated ground water into adjacent wetlands. A 1988 remedial investigation revealed that there is no longer a source of contamination at the site and that tris has contaminated the shallow aquifer but not the deeper aquifer. This limited response action addresses the ground water contamination in the shallow aquifer. The primary contaminant of concern affecting the ground water is (2-chloropropyl)-phosphate.

The selected remedial action for this site includes natural attenuation as the treatment of the principal threat to ground water; ground water, surface water, and sediment monitoring; and implementation of institutional controls. The estimated

(See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision - New Castle Spill, DE
First Remedial Action - Final
Contaminated Media: sediment, gw, sw
Key Contaminants: (2-chloropropyl)-phosphate

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 42
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

EPA/ROD/R03-89/077
New Castle Spill, DE
First Remedial Action - Final

16. Abstract (Continued)

present worth cost for this remedial action is $466,147, which includes O&M costs of $25,000.

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DIRECT QUESTIONS RESULTING FROM ILLEGIBILITY TO:

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o Further evaluation and bioassay testing if the trigger value of 100 ug/l tris in surface water of the adjacent wetlands is reached.

o Monitoring the sediments of the wetlands adjacent to the site on an annual basis for tris. Resample in the next quarter if an anomaly occurs in the results.

o Further evaluation and bioassay testing if the trigger value of 1000 ug/kg tris in the sediments of the adjacent wetlands is reached.

o Institutional restrictions on the placement of wells in the Columbia aquifer in the vicinity of the site.

o A five year effectiveness review to re-evaluate the site.

Declaration Statement

The selected remedy is protective of human health and the environment and is cost-effective. There are no applicable or relevant and appropriate requirements for tris, but this remedy meets the equivalent standard criteria "to be considered" in lieu of applicable or relevant and appropriate requirements. This remedy consists of monitoring for tris together with periodic evaluations to ensure that the natural degradation process is yielding the expected permanent result, that is, the decrease and eventual disappearance of tris in the Columbia and adjacent wetlands. This remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The present lack of human and environmental receptors and the natural remediation process makes treatment of the groundwater unnecessary.

Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years after initiation of remedial actions to ensure that the remedy continues to provide adequate protection of human health and the environment.

DATE September 27, 1989

Phillip G. Retallick
Director
Division of Air and Waste Management
Department of Natural Resources and Environmental Control
State of Delaware

DATE September 28, 1989

Edwin B. Erickson
Regional Administrator
EPA Region III

RECORD OF DECISION

DECLARATION

Site Name and Location

New Castle Spill Site
New Castle, Delaware

Statement of Basis and Purpose

This decision document presents the selected remedial action for the New Castle Spill Site, in New Castle, Delaware, in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, Section 113(k)(2)(B)(v), and to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record for the site. The attached index identifies the items which comprise the Administrative Record upon which the selection of the remedial action is based.

Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Remedy

New Castle Spill Site has One Operable Unit: groundwater contaminated with tris in the Columbia aquifer. This Operable Unit no longer has a source of contamination but requires a groundwater response action to address the potential threats posed by the contaminated groundwater. The underlying Potomac aquifer separated by a confining layer from the Columbia aquifer is not contaminated. The remedy selected for the site is limited action, which is monitoring and institutional restrictions. In utilizing this remedy, the principal threat at the site is not physically treated, but is allowed to be cleansed through natural attenuation.

The major components of the selected remedy include:

o Monitoring the Columbia aquifer on a quarterly basis for tris to ensure the effectiveness of the natural attenuation process.

o Monitoring the Potomac aquifer on an annual basis for tris to ensure that contamination has not occurred in the Potomac aquifer.

o Monitoring the surface water of the wetlands adjacent to the site on an annual basis for tris. Resample in the next quarter if an anomaly occurs in the results.

NEW CASTLE SPILL
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

I. SITE IDENTIFICATION

1) U.S. EPA Identification and Preliminary Assessment, 6/19/80. P. 100001-100004
2) Brief Summary Sheet for Witco Chemical DE-33, 8/19/80. P. 100005-10005
3) U.S.EPA Site Inspection Report, 9/23/80. P. 100006-100015

II. REMEDIAL ENFORCEMENT PLANNING

1) Secretarial Order by Consent In The Matter Of: Witco Corporation, 12/10/87. P. 200001-200028.
The following are attached:
a) a letter regarding the site classification as a state-lead enforcement site;
b) a report entitled " Work Plan for Remedial Investigation / Feasibility Study at the Former WITCO Corporation Site, 900 Wilmington Road, New Castle, DE";
c) a graphical project schedule for the New Castle, Delaware Site Remedial Investigation/Feasibility Study.

III. REMEDIAL RESPONSE PLANNING

1) Report: New Castle Spill Technical Review of Documents, Final Report, prepared by PRC Environmental Management, Inc., 2/3/86. P. 300001-300093.
2) Report: Work Plan for Remedial Investigation/Feasibility Studies at the Former Witco Corporation Site, 900 Wilmington Road,New Castle, Delaware, prepared by Environmental Resources Management, Inc., 8/87. P300094-300433.
3) Report: Final Project Report,New Castle Spill Site, New Castle, prepared by CDM Federal Programs Corporation, 11/11/88. P. 300434-300586.
4) Report: Final Remedial Investigation, Volume I, prepared by Environmental Resources Management, Inc., 5/5/89. P. 300587 -300982
5) Report: Final Endangerment Assessment, Volume II, prepared by Environmental Resources Management, Inc., 5/5/89. P. 300983-301148.
6) Report: Revised Draft Focused Feasibility Study, prepared by Environmental Resources Management, Inc.,8/1/89. P. 301149-301251.
7) Memorandum to Ms. Jean Parker, U.S.EPA, from Mr. Michael L. Dourson, U.S. EPA, re: Toxicity test conducted on rats, 2/[illegible]/84. P. 301252-311252.
8) Memorandum to Mr. Phil Retallick, U.S. EPA from Mr. Bruce Molholt, U.S.EPA, re: Toxicological Assessment of Fryol PCF, 10/15/84. P. 301253- 301258.

9) Memorandum to Ms. Galina Bendersky Chadwick, U.S. EPA, from Mr. Bruce Molholt, U.S. EPA, re: Studies on the toxicity of Fryol PCF, 10/15/84. P. 301259-301259.

10) Memorandum to Ms. Galina Bendersky Chadwick, U.S. EPA, from Mr. Bruce Molholt, U.S. EPA, re: Additional contaminants to be addressed in the toxicologic assessment, 5/16/85. P. 301260-301261.

11) Memorandum to Mr. Terry Stillman [sic], U.S. EPA, from Mr. Bruce Molholt, U.S. EPA, re: Comments on the Draft Remedial Investigation and Draft Endangerment Assessment, 10/21/88. P. 301262-301263.

12) Report: Proposed Plan for the New Castle Spill Site, New Castle, DE, prepared by Department of Natural Resources and Environmental Control and Environmental Protection Agency, Region III, 8/22/89 P. 301263-301271.

13) Transcript: Public Meeting for New Castle Spill Site, 9/6/89. P. 301271-301319.

GENERAL GUIDANCE DOCUMENTS *

1) "Promulgation of Sites from Updates 1-4," Federal Register, dated 6/10/86.

2) "Proposal of update 4," Federal Register, dated 9/18/85.

3) Memorandum to U. S. EPA from Mr. Gene Lucero regarding community relations at Superfund Enforcement sites, dated 8/28/85.

4) Groundwater Contamination and Protection, undated by Mr. Donald V. Feliciano on 8/29/85.

5) Memorandum to Toxic Waste Management Division Directors Regions I-X from Mr. William Hedeman and Mr. Gene Lucero re: Policy on Floodplains and Wetlands Assessments for CERCLA Actions, 8/6/85.

6) Guidance of Remedial Investigations under CERCLA, dated 6/85.

7) Guidance on Feasibility Studies under CERCLA, dated 6/85.

8) "Proposal of Update 3," Federal Register, dated 4/10/85.

9) Memorandum to Mr. Jack McGraw entitled "Community Relations Activites at Superfund Sites - Interim Guidance," dated 3/22/85.

10) "Proposal of Update 2," Federal Register, dated 10/15/84

11) EPA Groundwater Protection Strategy, dated 9/84.

12) Memorandum to U.S. EPA from Mr. William Heckman, Jr. entitled "Transmittal at Superfund Removal Procedures - Revision 2," dated 8/20/84.

13) "Proposal of Update 1," Federal Register, dated 9/8/83.

14) Community Relations in Superfund: A Handbook (interim version), dated 9/83.

15) "Proposal of first National Priority List," Federal Register, dated 12/30/82.

16) "Expanded Eligibility List," Federal Register, dated 7/23/82.

17) "Interim Priorities List," Federal Register, dated 10/23/81.

18) Uncontrolled Hazardous Waste Site Ranking System: A User's Manual (undated).

19) Field Standard Operating Procedures - [illegible] Surveillance (undated).

20) Field Standard Operating Procedures - [illegible] Safety Plan (undated).

* Located in Region II.

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RECORD OF DECISION

SUMMARY OF REMEDIAL ALTERNATIVES SELECTION

NEW CASTLE SPILL SITE

NEW CASTLE, DELAWARE

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DOVER, DELAWARE

and

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
PHILADELPHIA, PENNSYLVANIA

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I. SITE NAME, LOCATION AND DESCRIPTION

The New Castle Spill Site (NCSS) is a former manufacturing plant of the Witco Corporation located 0.5 miles west of the Delaware River and 0.5 miles north of the City of New Castle, Delaware. The study area associated with the site includes the Witco facility, the property of the New Castle Board of Water and Light (NCBWL) and the adjacent marsh. This area covers approximately six acres and is accessible via Route 9, also known as New Castle Avenue. (See Figure 1)

The Witco facility was formerly a manufacturing plant which utilized tris (2-chloropropyl)-phosphate (tris) in the production of plastic foams.

The NCBWL property was formerly used as a treatment plant for an on-site production well of the Potomac aquifer and a shallow infiltration gallery system for the Columbia aquifer. This system served as part of the potable water supply for the City of New Castle until its closure in 1978.

The area surrounding the site is a mixed commercial and residential area, bordered on the west by a marsh and on the east by a dual highway. It is relatively flat and located within the 100-year flood plain of the Delaware River. Elevations within the study area range from 0 to 10 feet above mean sea level. Surface water drainage from the site follows the gently sloping topography to the west-northwest and discharges to a marsh, which drains to the south via the Narrow Dyke Canal and ultimately to the Delaware River.

The marsh area on the west side consists of emergent and forested wetlands that support diverse flora and fauna. The Narrow Dyke Canal draining the marsh is a man-made canal for flood and mosquito control that is regulated by sluice gates at the confluence of the major drainage ditch and the Delaware River. Little tidal or salinity fluctuation is seen in this surface water due to the operation of the sluice gates. The Narrow Dyke Canal has occasional recreational uses.

The geology of the site consists of Pleistocene age sands and gravels of the Columbia Formation overlying Cretaceous age sands and gravels of the Potomac Formation. A thick clay layer, typical of the Potomac Formation, exists at the top of the Potomac sediments in the vicinity of the site. There are two aquifer systems at the site: the shallow, or Columbia aquifer, and the deep or Potomac aquifer. The thick clay layer at the top of the Potomac formation separates the two aquifers from being hydraulically connected. The shallow Columbia aquifer discharges to the freshwater non-tidal streams and to the Delaware Bay and Atlantic Ocean. It is not currently used as a potable water supply. The Potomac aquifer discharges primarily through pumping for municipal and industrial purposes. The Potomac aquifer supplies most of potable water to New Castle County.

The nearest population to the site is located approximately 250 feet west of the site, on the other side of the marsh. It is a residential community which receives its potable water supply from wells in the Potomac aquifer. Located to the south of the site are several commercial establishments also receiving potable water from the Potomac aquifer. Site access is limited by a fence on the Witco property .

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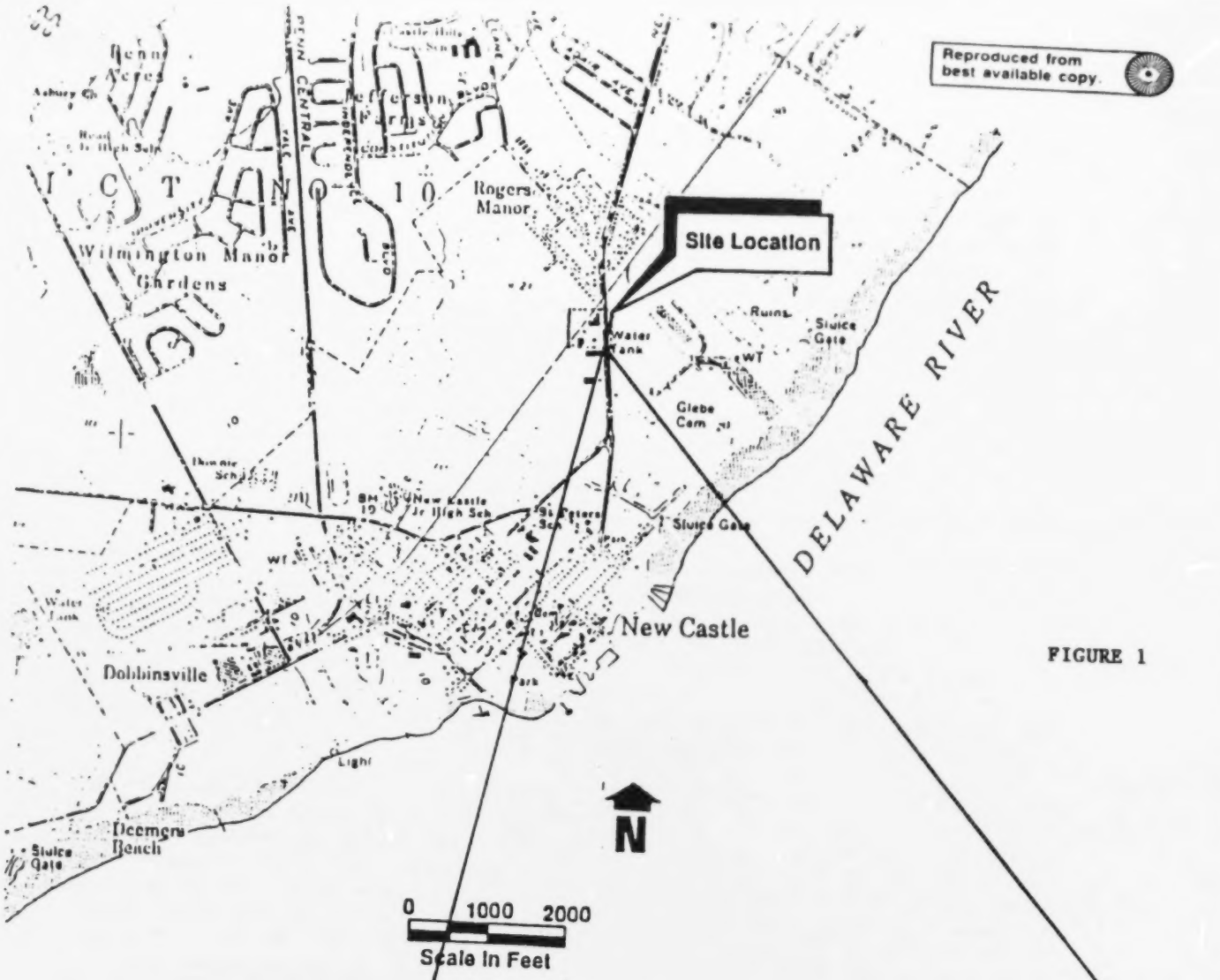
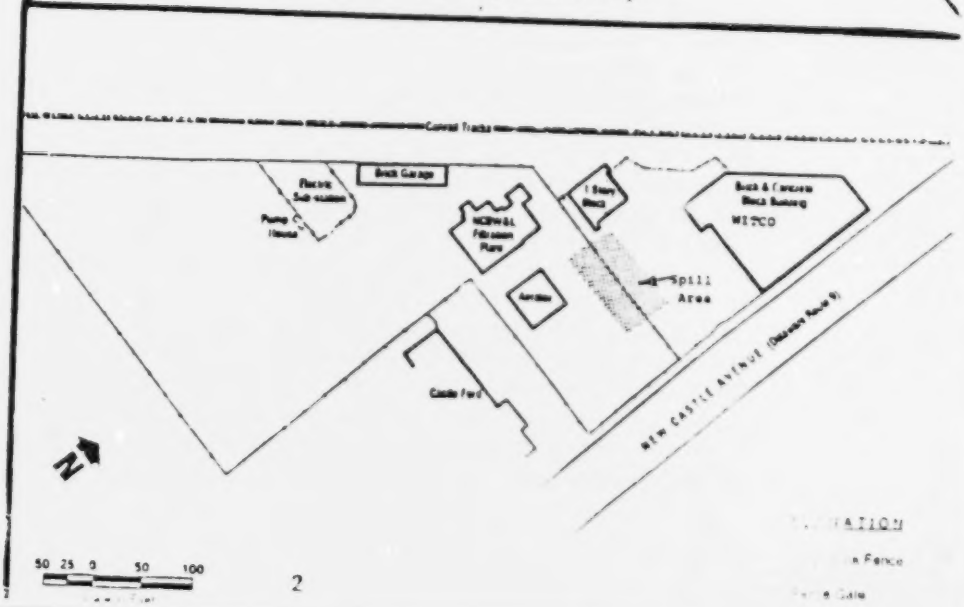


FIGURE 1

urce: USGS 7.5 Min. Topographic Quadrangle; Wilmington South, DE-NJ

New Castle Spill Site Map



II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1977, personnel of NCBWL noticed areas of dead grass on their property adjacent to the drum storage area of the Witco facility. This was brought to the attention of Witco, who subsequently conducted an investigation which determined the presence of tris in the soil in this area. It was estimated that approximately 4-5 drums of tris had been spilled onto the ground. Shortly following the discovery of the spill, contaminants were detected in the shallow gallery system supply. Under the direction of the State of Delaware Department of Natural Resources and Environmental Control (DNREC), the groundwater from this system was pumped and discharged to the adjacent wetlands. As result of this spill, DNREC requested the assistance of the United States Environmental Protection Agency (U.S.EPA) in the identification of tris in the groundwater. This study was conducted in January 1978 and indicated tris was present in the groundwater.

In September 1981, the U.S. EPA conducted a site inspection at the Witco facility and the adjacent NCBWL property. This inspection resulted in a Hazard Ranking System score of 39.57 and proposal to the National Priorities List (NPL). In December 1982, the Witco facility was listed on the NPL as the New Castle Spill Site. Between 1982 to 1987, numerous studies were conducted on the site by consultants for the NCBWL and Witco. The data generated from these studies was reviewed by EPA and DNREC and used to established the data needs for the remedial investigation for the site.

In December 1987, an Administrative Consent Order (ACO) was signed by the Witco Corporation and the DNREC to address the performance of the Remedial Investigation/Feasibility Study (RI/FS) and Endangerment Assessment (EA) for the site. The purpose of the RI was to determine the nature, extent and magnitude of the contamination at the site. It was accompanied by an EA which evaluated the risks to human health and the environment from the site. These activities were initiated by the Witco Corporation in February 1988 and finalized in May 1989. Upon their completion, a FS was also begun by Witco in June 1989 to evaluate remedial alternatives to the problems found at the site. The FS was finalized in August 1989 and followed by the development of the Proposed Plan.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public participation has been encouraged at the site. Interviews with the community and local municipal officials, as well as a presentation at a local municipal meeting have been conducted to familiarize the public with the site and the findings of the RI and EA. The Proposed Plan was advertised in the Wilmington-based News Journal newspaper, which has state-wide circulation, to inform the public of the alternative being proposed for selection. A 30-day comment period was was established from August 22, 1989 to September 22, 1989 to allow the public an opportunity to review and comment on the Proposed Plan and other pertinent documents for the site. A repository was established at the DNREC Building, 715 Grantham Lane, New Castle for public viewing of the Administrative Record for the site. A public meeting was held on September 6, 1989 to discuss the Proposed Plan and the findings of the RI, EA and FS. The public was encouraged to comment either at the meeting or in writing. The comments are summarized and responses provided in the Responsiveness Section of this document.

IV. SCOPE OF RESPONSE ACTION

From the RI, several important facts were established and have been used to develop a response action for this site. The facts are as follows: (1) The shallow Columbia groundwater is contaminated with tris ; (2) The Potomac aquifer is not contaminated with tris; (3) There is no interconnection between the Columbia and Potomac aquifers; (4) The source of contamination from tris no longer exists at the site ; (5) The Columbia aquifer is not currently being used as a potable water supply, but classified as a Class II B aquifer, a potential source for water supply; and (6) TCE has been identified in the shallow groundwater as originating from a site upgradient from the New Castle Spill Site.

From these facts, it is concluded that a groundwater response action should be considered for remediation of the site. This response addresses the principal threat of the sole operable unit at the site, the Columbia aquifer. The groundwater response action would protect against risks to human health and the environment through the use of "to be considered" (TBCs) criteria for the groundwater, surface water and sediments. The TBC for groundwater of 4.4 mg/l would be used as a cleanup goal for the site due to the lack of Applicable or Relevant and Appropriate Requirements (ARARs) for the contaminant of concern, tris. This TBC of 4.4 mg/l tris was derived by EPA as a health based drinking water level calculated from the RfD for tris of .125 mg/kg/day being consumed by an adult weighing 70 kg and drinking 2 liters of water per day. The TBCs for surface water and sediments as 100 ug/l and 1000 ug/kg respectively by the National Oceanic and Atmospheric Administration (NOAA) would not be considered as cleanup goals but as trigger values to require bioassay testing and further evaluation of the wetlands if reached.

The use of a groundwater response action at this site addresses the risks presented to human health and the environment from the Columbia aquifer under potential and hypothetical conditions. Currently, this site presents no risks since the Columbia aquifer is not being used as a potable water supply and has shown no adverse impact on the environment. However, since it is classified as Class IIB aquifer, a potential source of potable water supply, the use of a groundwater response allows us to provide for future use.

While the RI and EA concluded that tris contamination at the site caused no determinable adverse impact to human health and the environment, data on toxicity of tris are limited. EPA intends to conduct further toxicity testing to better determine any risks to human health and the environment from exposure to tris. When these studies are concluded, EPA will re-evaluate the site if necessary.

V. SITE CHARACTERISTICS

A Remedial Investigation was performed to investigate threats to the local groundwater, soil, stream sediments and surface water posed by contaminants at the site. A hydrogeological investigation was conducted which included the installation of five monitoring wells, a 6-inch pumping well, and the performance of a 24 hour pump test involving sustained pumping of the 6-inch pumping well while water levels in the surrounding monitoring wells were continuously measured. Groundwater sampling was conducted on the five new wells and twelve existing groundwater monitoring wells. A subsurface soil

study was conducted which included continuous split spoon samples taken to the water table at eight boring locations. A wetlands investigation was conducted consisting of: the collection of surface water and sediments from six sampling stations; a qualitative macroinvertebrae study; a wetland delineation; and a habitat assessment. In addition, a tidal study was conducted to determine tidal influence on the site.

From the RI, the following significant information was gained to characterize the site and allow for an assessment of site specific threats. The unconfined Columbia aquifer underlies the NCSS and is composed primarily of medium grained sand with an average transmissivity of 60,000 gal/day/ft. and an approximate saturated thickness of 23.5 feet. The groundwater flow of this aquifer varies from the north and south sections of the site. In the northern section, the groundwater flows northerly at a rate of 1.0 ft/day, while in the southwestern section, the groundwater flows westerly towards the marsh at a rate of 0.5 ft/day.(See Figure 2) There is no tidal influence on the groundwater in the study area.

Three distinct stratigraphic units are present as defined from the drilling program. These units are a surficial layer consisting of a variable sequence of clay, silty clay and silty sand; an intermediate layer (i.e., Columbia aquifer) consisting of medium grained sand; and a very dense, stiff clay layer at an average depth of 30 feet which designated the top of the underlying Potomac Formation.(See Figure 3)

The dense clay layer of the Potomac Formation encountered at a minimum of 5 feet in each newly installed well is considered continuous across the site. The average vertical permeability of this clay is 2.87×10^{-8} cm/sec which reflects an impermeable nature. The impermeable nature of this layer serves to isolate the Columbia aquifer from the underlying Upper Potomac aquifer and precludes aquifer interconnection. This impermeability is further substantiated by: (1) the 1986 pump test data for the Potomac aquifer which demonstrated a confined response to pumping; (2) the calculation of storage coefficient of 0.00011, which was indicative of a confined system; and (3) the depth to water measurements obtained in the pumping well of the Potomac which indicated its potentiometric surface extends approximately 15 feet above its confining layer. All of these characteristics demonstrate artesian conditions supporting the clay continuity throughout the site.

In the RI, the three media pathways of groundwater, soils, and the surface water and sediments of the wetlands were investigated for the source and extent and magnitude of contamination at the site.

In the groundwater sampling of the Columbia aquifer, three major Target Compound List (TCL) compounds were reported and and their maximums are as follows:

Compound	Concentration
Tris	110,000 ug/l
TCE	120 ug/l
1,2-Dichloroethene	11 ug/l

Of these, tris and trichloroethene (TCE) were the most commonly identified compounds. 1,2-dichloroethene [illegible] detected in only two wells and considered to be a common degradation [illegible] of TCE. Detectable and quantifiable concentration[illegible], ranging [illegible] to 110,000 ug/l were identified in 7

Water Table Contour Map, Columbia Aquifer
30 March 1988
New Castle Spill Site

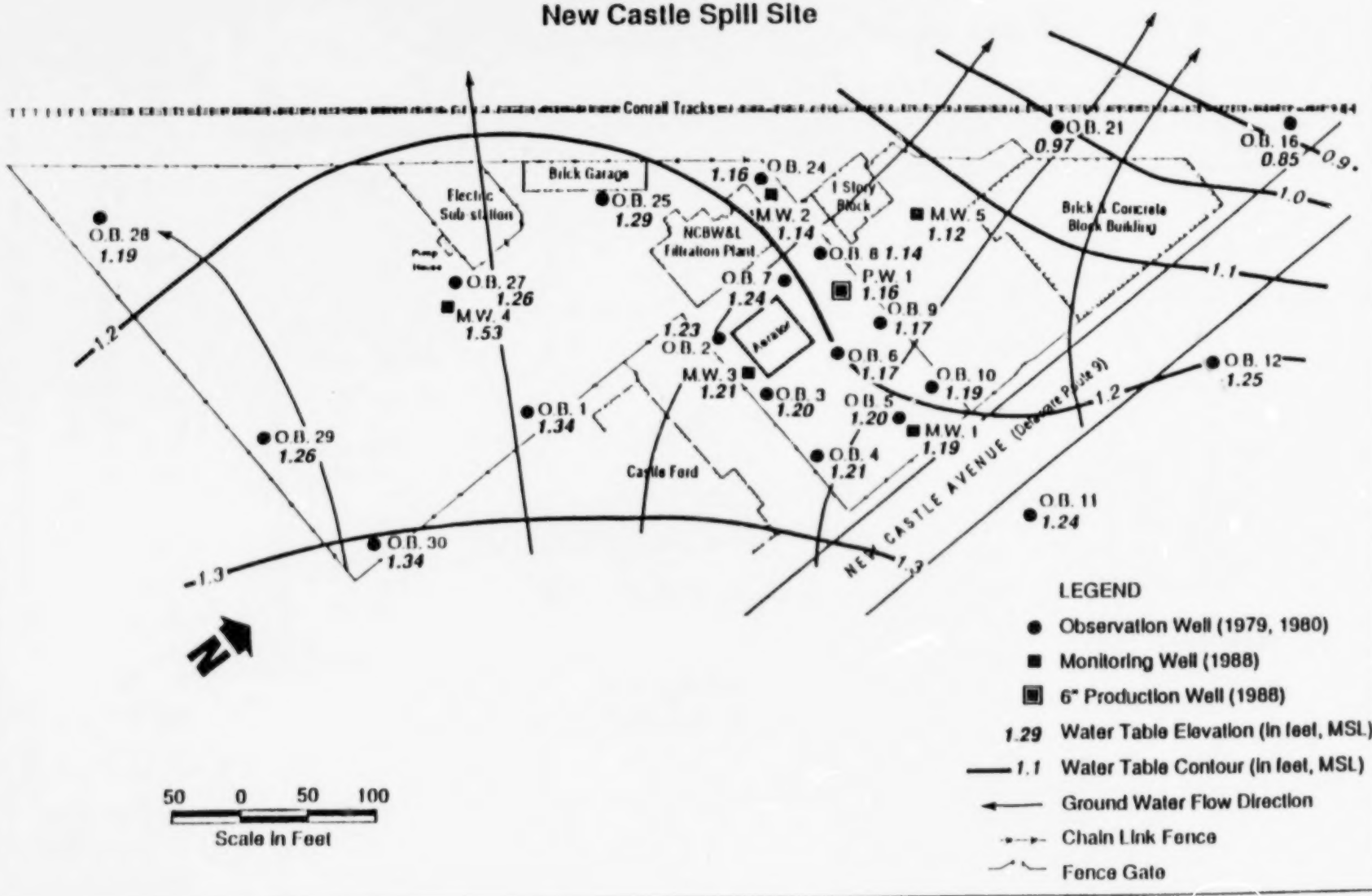


Figure 2

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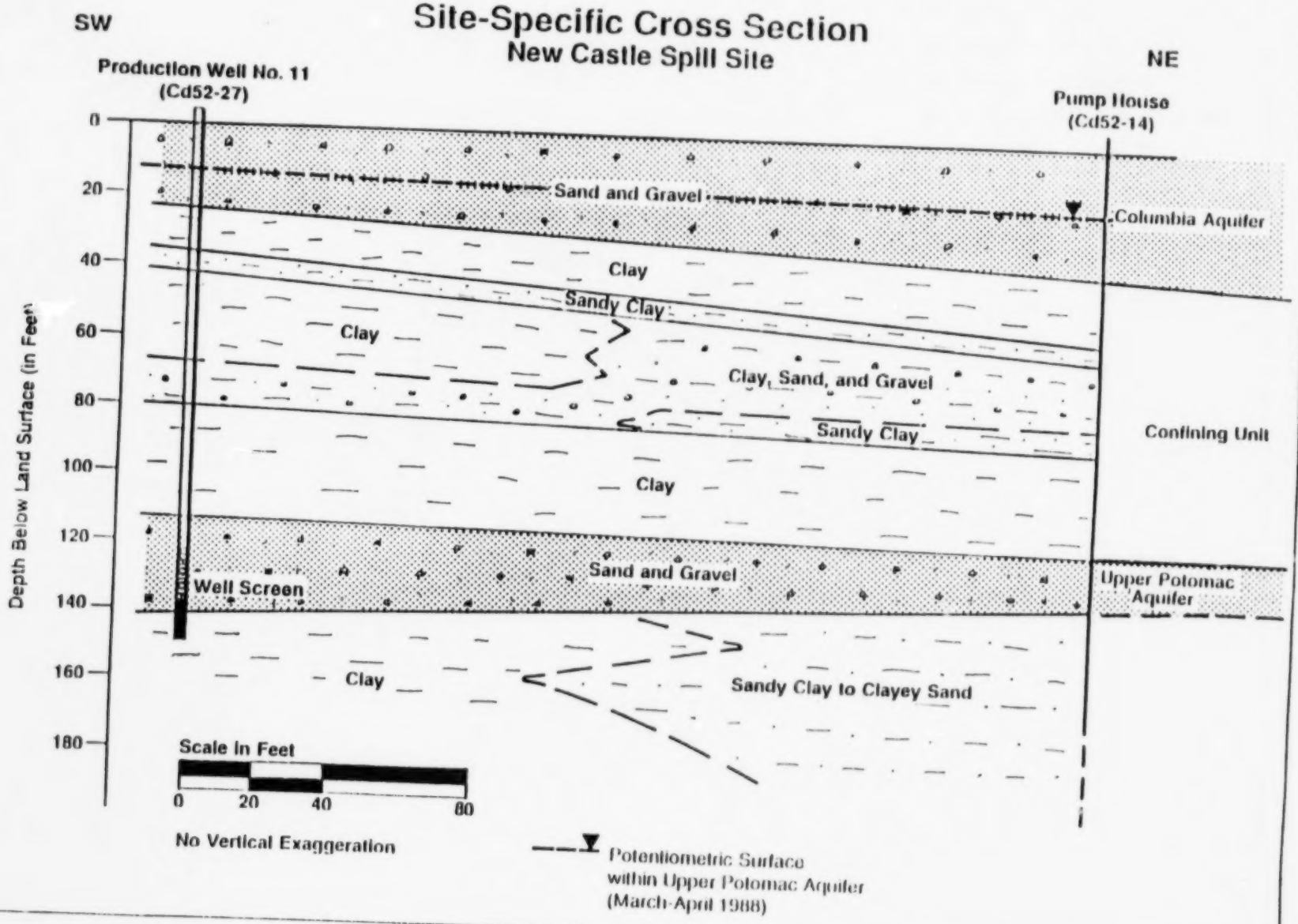

The ERM Group

Figure 1

Concentration of Tris(2-Chloropropyl) Phosphate in the OB Series Wells (µg/l), 18 April 1988

New Castle Spill Site

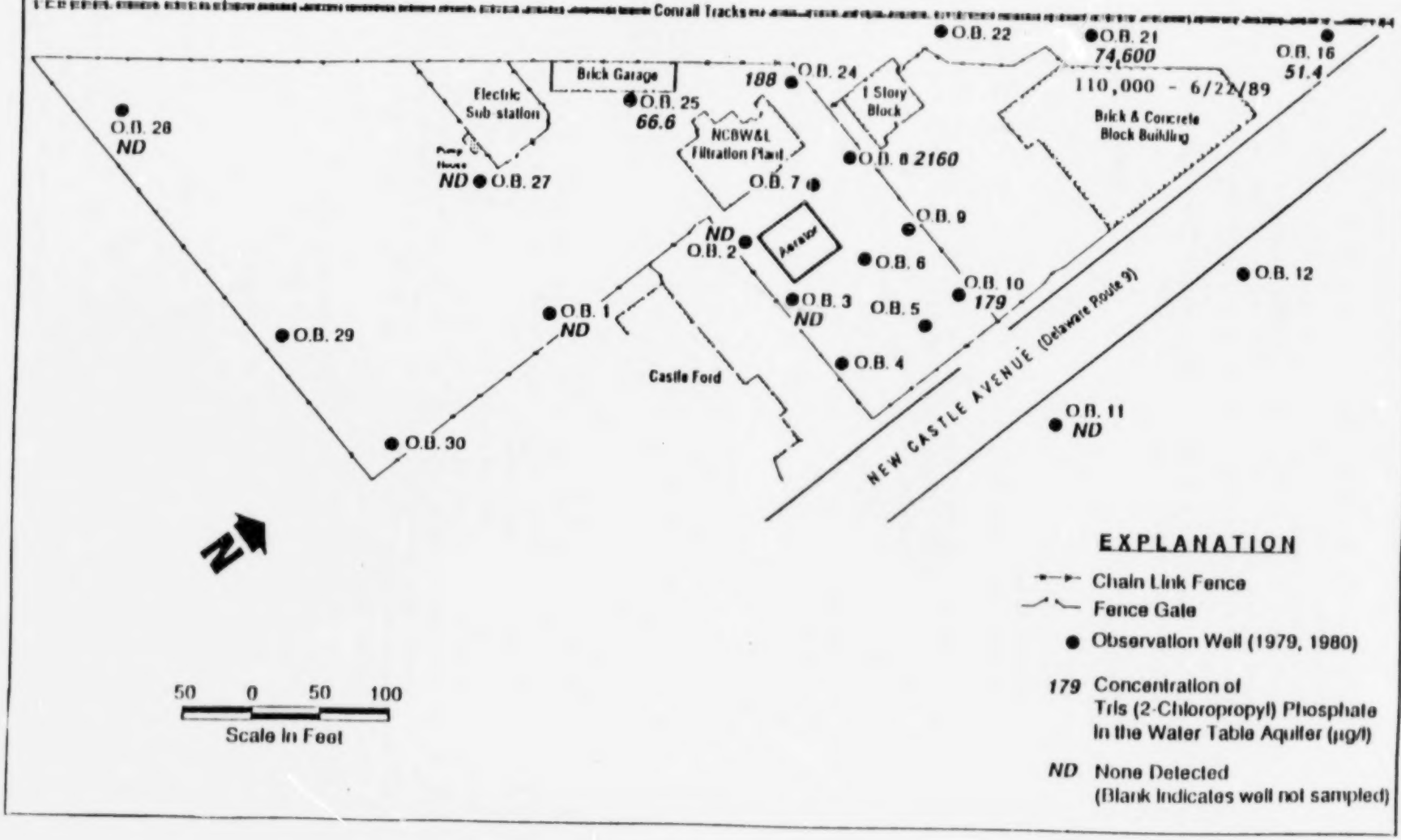

Figure 4

of 17 wells sampled. The distribution of tris in the Columbia aquifer was consistent with the spill source area, and reflected a reduced mobility by its occurrence primarily in the upper 10- feet of the aquifer.(See Figure 4) TCE was detected in 8 of 17 wells sampled, ranged from 1 to 120 ug/l. The highest concentration of TCE in groundwater occurred in wells located upgradient of the spill source area, indicating a source upgradient from the site.

In the subsurface sampling, four major TCL compounds were reported and their maximum concentrations are as follows:

Compound	Concentration	Depth
Tris	11.8 mg/kg	2-4 ft
Fluoranthene	3.6 mg/kg	2-4 ft
Phenanthrene	4.4 mg/kg	2-4 ft
Benzo(b)fluoranthene	2.5 mg/kg	2-4 ft

Of these compounds, tris was identified as the contaminant of concern as it was detected in 9 of 15 soil samples in the highest concentrations. The higher tris concentrations were found in the soils of the recognized spill source area. These levels, however, do not represent levels which threaten human health and the environment and are no longer considered a source of contamination. TCE was not detected in any soil samples. Therefore, it can be concluded that the presence of TCE in the groundwater originates from an up-gradient and off-site source and cannot be attributed to the New Castle Spill Site.

In the wetlands investigation, two rounds of surface water and sediment sampling occurred with the second round including TCE. The first round in March detected concentrations of tris in the surface water ranging from none detected to 42 ug/l. The highest concentration being detected at the sampling location closest to the site. The second round in November detected tris levels in the surface water ranging from 1.2 to 5.5 ug/l reflecting an order of magnitude lower than the original sampling in March. There was no TCE detected in any of the surface water samples. The sediment sampling in March detected no level of tris in all of the six sampling locations. In the second round of sediment sampling in November, tris levels were detected at 402 and 300 ug/kg at two locations slightly away from the site. In addition, TCE was detected at this time at an estimated value of 3 ug/kg at the sampling location closest to the site. A wetlands delineation and habitat assessment identified emergent and forested wetlands supporting a diverse flora and fauna unaffected by the New Castle Spill Site. The tidal study indicated no tidal influence exists at the site.

The conclusions from these sampling studies are; (1) The source of tris contamination no longer exists at the site; (2) Tris contamination exists in the Columbia aquifer; (3) There is no tris contamination in the Potomac aquifer; (4) The source of TCE contamination has not identified but is indicated as an upgradient source from its detection in wells located upgradient from the spill source area; (5) The contaminant levels in the wetlands are well below Ambient Water Quality Standards and (6) The tris contamination has no adverse impact on the environment as indicated by the habitat assessment.

Curr[illegible] and future exposure pathways were also identified from the RI and inc[illegible] (1) current and future exposure to groundwater from use as potable wa[illegible]ly (2) current and future exposure to surface water from incidental

EXPOSURE PATHWAYS FOR NEW CASTLE SPILL SITE

...to	Transport Media	Source	Release Mechanism	Exposure Point	Exposure Route	Selected for Analysis
...ent, existing	Air	Contaminated soil	Volatilization	On-site or Off-site	Inhalation	No - site covered by cement over majority of area
			Fugitive Dust	On-site or Off-site	Inhalation	No - site covered by cement over majority of area
		Contaminated surface water	Volatilization	On-site or Off-site	Inhalation	No - Tris not volatile, other indicators present in low concentrations
	Surface Water	Contaminated groundwater	Ground Water Discharge	Adjacent marshland	Dermal Contact	Yes - Marsh is near residential area
		Ponded water	Surface Runoff	Adjacent Marshland	Dermal Contact	Yes - Ponded area near tracks runs off to marsh area
	Soil/Sediments	Contaminated ground water	Groundwater Transport, Adsorption	Adjacent Marshland	Dermal Contact	*Yes - Marsh soil is exposed in dry weather includes incidental ingestion*
					PICA Behavior	No- Behavior not likely
		Spill	Adsorption	On-Site	Dermal Contact	No - Site covered by cement over majority of area
Hypothetical Future use	Ground Water	Contaminated soil	Leaching, Transport	Local Residence	Dermal contact	Yes - Future use of Columbia aquifer
			Leaching, Transport	Local Residence	Ingestion	Yes - Future use of Columbia aquifer
			Leaching, Transport, Volatilization	Local Residence	Inhalation	Yes - Future use of Columbia aquifer

Italics represents change in table

Table 1

ingestion and dermal contact, and (3) current and future exposure to soils from ingestion and dermal contact. (See Table 1)

VI. SUMMARY OF SITE RISKS

In conjunction with the Remedial Investigation, an Endangerment Assessment (EA) was conducted to evaluate the risks that compounds detected at the site posed to human health and the environment. This assessment consisted of four evaluations: identification of indicator compounds, which are used to represent the potential risks posed by carcinogenic and noncarcinogenic compounds at the site; an exposure assessment which includes the calculations of doses to potentially exposed human and/or non-human populations, a toxicity evaluation of the potential carcinogenic and noncarcinogenic effects of site indicator compounds; and characterization of the risks to human populations and/or the environment.

In the selection of indicator chemicals, three mediums were considered, the soil, the groundwater and the surface water. All three mediums were identified as the mediums of concern by examining the levels of contaminants present and the exposure pathways. The indicator compounds identified for the site with mediums of concern are tris (2-chloropropyl) phosphate (soil,surface water and groundwater), trichloroethene (TCE) (groundwater), and trans 1-2 dichloroethene (groundwater). The maximum concentrations on which the risk assessment was conducted are as follows:

Compound	Groundwater	Surface Water	Soil
trans-1,2-dichloroethene	.011mg/l		
Trichloroethene	0.12mg/l		
Tris	110.0mg/l	.042mg/l	11.74mg/kg

In the exposure assessment the fate and transport of the indicator compounds were evaluated, the exposure scenarios were established to determine possible exposure to potentially affected populations and the doses and resultant intakes were calculated. The physical properties and the relative importance of processes influencing the fate and transport of the indicator compounds are included on Table 2. In addition, the half-life of tris of roughly 300 days was taken into consideration in the assessment. This half-life value is based on the time period (1983-1988) that it took for tris to degrade from 10,100 ppm to 110 ppm and comparison to DDT, a similar aqueous structure.

Exposure scenarios established for the environmental media are as follows:

Medium	Exposure Route
Air	None
Surface Water	Dermal Contact
	Dermal Contact while Bathing
Groundwater*	Ingestion of Drinking Water
	Inhalation while Bathing

* Evaluated only as a hypothetical scenario

The potentially affected populations consist of the adult and children living in the residential area to the west of the site. Subchronic and chronic daily intakes for the actual and hypothetical scenarios were calculated for these

Table 2

RELATIVE IMPORTANCE OF PROCESSES INFLUENCING FATE
OF THE INDICATOR COMPOUNDS FOR THE NEW CASTLE SPILL SITE

COMPOUND	SORPTION	VOLATILIZATION	BIODEGRADATION	PHOTOLYSIS	HYDROLYSIS	BIOACCUMULATION	OXIDATION
Trichloroethane	NO	YES	YES	NO	YES	NO	UNCLEAR
trans-1,2-Dichloroethene	NO	YES	NO	NO	YES	NO	UNCLEAR
tris(2-Chloropropyl)phosphate	YES	NO	UNCLEAR	UNCLEAR	NO	NO	UNCLEAR

REFERENCES.
MILLS, W.B., ET AL., 1982
CALLAHAN, M.A. ET AL., 1979

PHYSICAL PROPERTIES OF THE INDICATOR COMPOUNDS
FOR THE NEW CASTLE SPILL SITE

PROPERTY	trans-1,2-Dichloroethene	Trichloro-ethene	tris(2-Chloro propyl)phosphate
MOLECULAR WEIGHT, g	9.69E+01	1.31E+02	328.00
MELTING POINT, °C		-7.30E+01	
BOILING POINT, °C	6.00E+01	8.70E+01	
DENSITY, g/mL	1.26E+00	1.46E+00	1.29
FLASH POINT, °C	3.90E+01		218.00
PARTITION COEFFICIENT			
WATER SOLUBILITY, mg/L(25°C)	6.30E+04	1.10E+03	0.11 wt % or 1100 mg/L
OCTANOL WATER, Kow	3.02E+00	2.40E+02	199 *
SEDIMENT WATER, Koc	5.90E+01	1.26E+02	92.7 **
MICROORGANISM WATER, Kb [(ug/g)/(mg/L)]	4.80E+01	9.70E+01	
VOLATILIZATION COEFFICIENTS			
HENRY'S LAW COEFFICIENTS (atm-m3/mol)	6.58E-03	9.10E-03	
VAPOR PRESSURE, mmHG (25°C)	2.65E+02	5.79E+01	<2
REAERATION RATE RATIO Kv/Ko	6.01E-01	5.50E-01	

Source: Superfund Health Evaluation Manual, USEPA 1986
Aquatic Fate Process Data for Organic Priority Pollutants, Mabey et al., 1982.

* From EPA comment package dated March 1989
** From SPHEM, 1986 log Koc = (-0.55 x Log solubility) + 3.64

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populations and have been used to assess the carcinogenic risk and acute and chronic effects from the exposures.

The toxicity evaluation establishes a data base against which exposure point intakes can be compared during the risk characterization. It identifies potential carcinogens and their cancer potency factors (CPFs) as well as reference doses for noncarcinogens. CPFs have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by an estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper bound estimate of the lifetime excess cancer risk associated with exposure at that intake level. Reference doses (RfDs) have been developed by EPA to indicate the potential for adverse health effects from exposure to chemical exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from the environmental media can be compared to the RfDs.

The risk characterization includes comparisons between estimated daily intakes and Acceptable Daily Intake (ADI) or reference doses (RfDs) for noncarcinogenic compounds and estimates of excess cancer risk for exposure to carcinogenic compounds. The comparison of estimated daily intakes of contaminants to reference doses (RfDs), or levels established below the dose at which effect are expected to occur results in a 'Hazard Index (HI). The acceptable risk range adopted by EPA for the HI is 1.0. The excess lifetime cancer risk is the incremental increase in the probability of developing a cancer from exposure to contaminants at the site. The acceptable excess cancer risk range adopted by EPA is 10^{-4} to 10^{-7}.

In addition to the human risk assessment, an environmental assessment was conducted which identified potential environmental pathways and receptors as shown on Table 3. This assessment consisted of: (1) comparing wetlands sampling results to Ambient Water Quality Criteria and toxicity values; (2) a habitat assessment; and (3) a macroinvertebrae survey.

a. Risks from Current Exposure to Groundwater as a Potable Water Supply

Currently, there is no exposure to the groundwater from the Columbia aquifer as a potable water supply. All supplies are being obtained from the Potomac aquifer. Therefore, the HI does not exceed the recommended value of less than one and the lifetime cancer risk is approximated as zero.(See Table 4)

b. Risks from Future Exposure to Groundwater as a Potable Water Supply

If in the future, the groundwater of the Columbia aquifer should be used as a potable water supply, populations would be exposed to risks from ingestion, inhalation and dermal contact. The noncarcinogenic risk from this exposure or the HI, calculated for the upper bound worst case would be $6.68 \times 10^{+1}$, which exceeds the recommended value of less than one. This exceedance can be contributed solely to the presence of tris in the groundwater and not the other indicator compounds. The lifetime weighted carcinogenic risk for this future use calculated for upper bound worst case estimate would be 1×10^{-4}, which is within the EPA's acceptable range of 1×10^{-4} to 1×10^{-7}. (See Table 4)

POTENTIAL ENVIRONMENTAL EXPOSURE PATHWAYS
NEW CASTLE SPILL SITE

MEDIUM	SOURCE	RELEASE MECHANISM	EXPOSURE POINT	EXPOSURE ROUTE	POPULATION	QUALITATIVE POTENTIAL AS PATHWAY **
Macroinvertebrae	Contaminated Surface Water and Sediments	Leaching and Transport	Adjacent Marshland	Ingestion	Bottomfeeders - fish	Low
		Bioconcentration			Game Fish	Low
					Fish-Eating Birds *	Low
					Mammals (muskrats)	Low
Game Fish	Macroinvertebrae	Bioconcentration	Marshlands	Ingestion	Humans	Low
Game Birds	Macroinvertebrae Fish	Bioconcentration	Marshlands	Ingestion	Humans	Low

Table 3

*Includes wading birds, ducks, herons, hawks
**Low potential to biomagnify in the food chain because of the low bioconcentration factors for these compounds

	BCF, L/kg (US EPA, 1986)
trans-1,2-Dichloroethene	1.6
Trichloroethene	10.6
tris-(2-Chloropropyl)phosphate	2.7***

***Based on tris(2,3-Dibromopropyl)phosphate

Table 4

SUMMARY OF CALCULATED CARCINOGENIC RISKS AND NONCARCINOGENIC HAZARD INDICES FOR THE NEW CASTLE SPILL SITE

*PRESENT, EXISTING SCENARIO**		Upper Bound Reasonable Case	Upper Bound Worst Case	U.S. EPA'S RECOMMENDED GUIDELINE
CARCINOGENIC RISK		≈ 0E+00	≈ 0E+00	1E-04 to 1E-07
NONCARCINOGENIC HAZARD INDEX	Subchronic	1.45E-05	1.45E-05	1
	Chronic	3.76E-06	1.45E-04	1
*HYPOTHETICAL FUTURE-USE SCENARIO***		Upper Bound Reasonable Case	Upper Bound Worst Case	U.S. EPA'S RECOMMENDED GUIDELINE
CARCINOGENIC RISK		3E-05	1E-04	1E-04 to 1E-07
NONCARCINOGENIC HAZARD INDEX	Subchronic	**6.71E+00**	**6.71E+00**	1
	Chronic	**8.69E+00**	**6.68E+01**	1

Bold value indicated an exceedance of U.S. EPA's risk/hazard guideline
Upper bound reasonable case represents the average concentration detected times either the reference dose or carcinogenic potency factor
Upper bound worst case represents the maximum concentration detected times either the reference dose or carcinogenic potency factor

≈ = approximate

* - Surface water and soil/sediment exposure
** - Columbia aquifer ground water exposure

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c. **Risks from Current and Future Exposure to Surface Water**

The current and future exposure to the surface water receiving discharge from the Columbia aquifer would be through dermal contact and incidental ingestion. The risk presented by these exposures is within the acceptable range of less than one for noncarcinogenic risk and 1×10^{-4} to 1×10^{-7} for carcinogenic risks. (See Table 4)

d. **Risks from Current and Future Exposure to the Soils**

The current and future exposures to the soils would be through dermal contact in the soils or sediments of the marsh and through ingestion, (i.e., PICA Behavior). The risk presented by these exposures is within the acceptable range of less than one for noncarcinogenic risks and 1×10^{-4} to 1×10^{-7} for carcinogenic risks. (See Table 4)

e. **Risks to the Environment from the Site Contaminants**

The environmental assessment concluded that there is (1) no exceedance of Ambient Water Quality Criteria by measured surface water concentrations, (2) no exceedance of toxicity values for the most sensitive aquatic species tested, (3) no adverse impact to the biotic communities of the wetlands ecosystem from contaminants migrating off NCSS, and (4) low qualitative potential for bioaccumulation of these compounds in the aquatic species and less potential for biomagnification of the food chain to human populations. (See Table 3)

VII. DOCUMENTATION OF SIGNIFICANT CHANGE

The Proposed Plan was released for public comment on August 22, 1989. The Proposed Plan identified Alternative 2, limited action with monitoring of the Columbia aquifer and the surface water and sediment of the adjacent wetlands, as the preferred alternative. During the public comment period, the public expressed concern over the possible contamination of the Potomac aquifer through interconnection to the Columbia aquifer. DNREC and EPA have decided to add a degree of protectiveness to the original preferred alternative by including sampling of the Potomac aquifer on an annual basis for tris.

VIII. DESCRIPTION OF ALTERNATIVES

a. **Remedial Alternatives Considered**

A groundwater response action consisting of four alternatives was considered for remediation of the site. The alternatives are as follows:

Alternative 1: No Action

The no action alternative requires no remedial action. The existing site conditions would remain unchanged. There would no institutional or monitoring requirements on site or off site. A five year effectiveness review would be conducted.

Alternative 2: Limited Action with Groundwater and Wetlands Monitoring and the Use of Institutional Controls

The limited action alternative consists of groundwater monitoring of the Columbia and Potomac aquifers, and surface water and sediment monitoring of the adjacent wetlands for tris. The groundwater monitoring of the Columbia aquifer would be performed quarterly for tris until the TBC of 4.4 mg/l (See Section IV.) is achieved. The Potomac aquifer would be monitored annually for the presence of tris as an additional degree of protectiveness. The surface water and sediments will be monitored for tris annually unless an anomaly is detected, at which time, monitoring would occur in the next quarter. Additionally, a TBC for the surface water and sediment of 100 ug/l and 1000 ug/kg respectively would act as a trigger value for requiring bioassay testing and further evaluation. Institutional controls restricting well development in the Columbia aquifer would also be implemented as part of this alternative. A five year effectiveness review would re-evaluate the effectiveness of this remedy.

Alternative 3: Extraction Wells, Granular Activated Carbon Treatment and Discharge to Surface Water

This alternative requires pumping of groundwater from the Columbia aquifer through extraction wells, treating the groundwater in a granular activated carbon system and discharge to the surface waters of the Narrow Dike Canal. Monthly monitoring of the treatment system influent and effluent and continuous flow measurements would be conducted. Implementation time considered is 30 years or until the TBC for tris in the groundwater is achieved. A five year effectiveness review would re-evaluate the effectiveness of this remedy.

Alternative 4: Extraction Wells, Discharge to Publicly Owned Treatment Works (POTW)

This alternative consists of pumping the groundwater from the Columbia aquifer through extraction wells and discharging it to a sanitary sewer for treatment at POTW. Monthly monitoring and continuous flow measurement would be conducted on the discharge. Implementation time considered is 30 years or until the TBC for tris is achieved. A five year effectiveness review would re-evaluate the effectiveness of this remedy.

b. Major ARARs and TBCs Utilized for the Remedial Alternatives

ARARs and TBCs being met/utilized for specific components of the alternatives can be considered contaminant-specific, action-specific, or location-specific. The ARARs and TBCs associated with the four previously described alternatives are as follows:

Contaminant Specific ARARs and TBCs

Contaminant specific ARARs are not available for tris. Where there are no "to be considered" criteria to develop cleanup goals. For New Castle Spill

Site, three TBCs were developed to address groundwater, surface water and sediment cleanup goals. The TBCs are as follows:

- The TBC for tris in the groundwater was established at 4.4 mg/l by U.S. EPA. This TBC is considered applicable to Alternative 3 and 4 where pump and treat activities can achieve the TBC. It is not applicable to Alternative 1 where no remedial action is performed. It can be waived for Alternative 2 based on satisfying the following criteria: Equivalent Standard of Performance - the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable, standard, requirement, criteria or limitation through the use of another method or approach (CERCLA Section 121 (d)(4)(D).)

- The TBC for tris in the surface water was established by the National Oceanic and Atmospheric Administration (NOAA) at 100 ug/l as a trigger value to require bioassay testing and further evaluation if reached. This TBC is applicable to Alternatives 2 and 3.

- The TBC for tris in the sediments was established by NOAA at 1000 ug/kg as a trigger value to require bioassay testing and further evaluation if reached. This TBC is applicable to Alternatives 2 and 3.

Action Specific ARARs and TBCs

CERCLA Section 121 (e) exempts any response action conducted entirely on site from having to obtain a Federal, State or local permit, where the action is carried out in compliance with Section 121. The response action need only comply with the substantive aspects of ARARs, not with the corresponding administrative requirements. For any response actions off site, action - specific ARARs must be met.

- The Delaware River Basin Commission (DRBC) regulates surface water and groundwater withdrawal and discharges within the Delaware River Basin. The requirements of the DRBC are considered applicable to the activities of Alternative 3 for the installation of an extraction well.

- The State of Delaware Regulations Governoring the Construction of Monitoring Wells regulates the construction of extraction wells through the use of permits. These regulations are applicable to Alternatives 3.

- The Natural Pollutant Discharge Elimination System (NPDES) implemented under 40 CFR Part 122-125 has substantive requirements which must be identified and complied with in order to discharge to surface water. A NPDES permit is not required but the substantive requirements must be met. These requirements are applicable to Alternative 3.

- The 40 CFR Part 403.5 requirements control the indirect discharge of pollutants to a POTW. These requirements are applicable to Alternative 4.

- Local POTW requirements control the acceptance of a discharge for treatment at the POTW. These requirements will be applicable for the discharge from Alternative 4.

- The Regulation of Non-Domestic Waste Water Discharge into the Public Sewer System, Chapter 16, Article 8 of the New Castle County Court

controls the discharge to a sanitary sewer. These regulations would be considered applicable to Alternative 4.

Location Specific ARARs

CERCLA Section 121 (e) exempts any response action conducted entirely on site from having to obtain a Federal, State or local permit, where the action is carried out in compliance with Section 121. The response action need only comply with the substantive aspects of ARARs, not with the corresponding administrative requirements. For response actions off site, location - specific ARARs must be met.

- The Delaware Department of Natural Resources and Environmental Control Wetlands Regulations (Revised June 29, 1984) and the Wetlands Act (Title 7, Del. Code, Chapter 66) regulates any activities which may impact the wetlands. These requirements would be applicable to Alternative 3 as its activities could impact the wetlands.

- The U.S. Army Corps of Engineers under the Clean Water Act, Section 404 regulates permitting of activities in the wetlands. Alternative 3 would require a U.S. Army Corps of Engineers permit. This ARAR is applicable to Alternative 3 activities.

- The 40 CFR Part 264.18 (b) regulates the design, construction, maintenance and operation of a treatment facility within a 100 year floodplain. Alternative 3 would require a treatment facility to be constructed in the 100 year floodplain of the Delaware River. This ARAR would be applicable to Alternative 3.

-Protection of Wetlands and Executive Order 11988, Floodplain Management and requires agencies to avoid or minimize adverse impacts to wetlands and floodplains, and to preserve and enhance the natural values of wetlands and floodplains. Alternative 3 activities would fall under this applicable ARAR.

- The Delaware Department of Natural Resource and Environmental Control Regulations Governing the Use of Public Subaqueous Lands (revised July 30, 1985) and Subaqueous Lands (Chapter 72) regulates activities which affect subaqueous lands. Alternative 3 would require a permit for activities affecting subaqueous lands. This ARAR is applicable to Alternative 3.

- Approval from Conrail is needed for right of way for activities occurring adjacent to the wetlands. This would be considered an applicable ARAR for Alternative 3.

Location Specific TBCs

- The U.S. EPA'S Groundwater Protection Strategy (GPS) is not a promulgated regulation, and therefore is not a potential ARAR for a Superfund site. However, the NCP lists the U.S. EPA's GPS among the other criteria, standards, and guidance "to be considered" in Superfund. For this reason, the U.S. EPA's GPS has been recognized as a TBC for the New Castle Spill Site. Under the GPS, the aquifer at the site has been classified as a Class II B. A TBC criteria for groundwater remediation has been established at 4.4 mg/l of by U.S. EPA. This TBC is

considered applicable to Alternatives 2,3,4, as they all have either monitoring controls and/or institutional controls. Alternative 1 cannot meet this ARAR.

IX. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

a. Comparative Evaluation of Alternatives

In the following section, each of the four alternatives are comparatively evaluated against the nine criteria established by the U.S. EPA for the selection of the remedy. This evaluation will demonstrate the abilities of the alternatives to protect human health and the environment, comply with state, federal and local statutory requirements, be easy to implement, achieve long and short-term effectiveness, reduce toxicity, mobility and volume and be cost-effective.

1. Overall Protection

Overall protection is an assessment of the degree of protectiveness provided by the alternatives to human health and the environment through their elimination, reduction or control of the risks through treatment, engineering or institutional controls. All of the alternatives can be considered protective of human health and the environment with the exception of Alternative 1, which does not remove the risk or monitor the contaminants migration. Alternative 3 and 4 would provide a greater degree of protectiveness for potential groundwater user through immediate groundwater recovery and treatment. Alternative 2 would not immediately eliminate the hypothetical risk from the site but it exhibits protectiveness through monitoring of the groundwater, surface water and sediments, use of institutional controls and five year effectiveness review.

2. Compliance to ARARs and TBCs

Comparative analysis of compliance with applicable or relevant and appropriate requirements (ARARs) of the four alternatives includes a review of state and federal applicable or relevant and appropriate contaminant-specific, action-specific, and location-specific requirements. This analysis also addresses other concerns identified as "to be considered" (TBCs). TBCs are non-promulgated advisories, criteria or guidance issued by the Federal or State government that are not legally enforceable standards. The U.S. EPA and the State may agree to follow the TBCs when there are no ARARs to address a particular contaminant or situation such as in the case of tris (2-chloropropyl) -phosphate at the New Castle Spill Site.

Alternative 1 is a no action alternative without monitoring or institutional controls, so therefore, no action-specific, contaminant-specific or location-specific ARARs apply. However, the TBCs of the U.S. EPA GPS and the TBCs for groundwater, surface water and sediments would be considered applicable. Alternative 1 would not meet these TBCs.

Alternative 2 is limited action with monitoring and institutional controls of which there are no applicable action-specific, contaminant-specific or location-specific ARARs. The TBCs of the GPS, and the TBCs for groundwater, surface water and sediments are applicable for this alternative. This alternative meets the surface water and sediment TBCs but is unable to meet the TBCs of the GPS and the groundwater. However, it does satisfy the criteria to invoke a waiver for these TBCs based on the following principle:

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Alternative 2 can attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach. (CERCLA Section 121 (d)(4)(D).)

Alternative 3 is the use of extraction wells, treatment with GAC and discharge to surface water. For this alternative, there are numerous and significant ARARs and TBCs as shown on Section VIIIb above. Although this alternative should be able meet the ARARs and TBCs, the administrative and substantive requirements for this alternative requires much more implementation than Alternative 1, 2 or 4. Also this alternative could possibly impact the wetlands.

Alternative 4 is the use of extraction wells, discharge to the sanitary sewer and treatment works. This alternative meets the applicable ARARs and TBCs as shown in Section VIIIb above. It requires only one state permit but also requires permission to discharge to the local POTW, which in the past has expressed concern over Superfund site discharges.

3. Long- Term Effectiveness

The long- term effectiveness criterion examines the extent and effectiveness of controls that may be required to manage the risks posed by treatment residuals and/or untreated wastes. All of the alternatives are expected to achieve long- term effectiveness and permanence, either through pump and treat or natural attenuation and the five year effectiveness review.

4. Reduction of Toxicity, Mobility and Volume

Reduction of toxicity, mobility and volume refers to the amount of material to be treated, the amount of hazardous materials that will be destroyed or reduced, and the degree of expected reduction. Only Alternative 3 provides treatment which accomplishes an irreversible reduction in toxicity, mobility and volume. Alternative 4 does remove the contaminant but the corresponding reduction of toxicity depends on the treatment effectiveness of the POTW. Alternative 1 and 2 will not actively afford a reduction in toxicity, mobility and volume, except through natural attenuation processes. Alternative 2, however, does not address the waste left onsite through its monitoring activities of the groundwater, sediments and soils, institutional controls, and the five year effectiveness review.

5. Short- Term Effectiveness

The short-term effectiveness criterion examines the effectiveness of the alternative to protect the health of the community and workers during remedial actions activities, the potential for adverse impact to the environment from the implementation of an alternative, the effectiveness of the available mitigation measures in preventing or reducing the impacts and time until the remedial response objectives are met. All of the four alternatives would be considered protective of the community and workers. Only Alternative 3 could have a slight impact on the wetlands and surface waters, because of the need to construct a discharge line through the wetlands. Alternative 3 and 4 may have a shorter implementation time to that of Alternative 1 and 2. This is dependent on any difficulties which may be encountered implementing Alternatives 3 and 4.

6. Implementability

The evaluation of implementability considers the technical and the administrative feasilibity of the alternatives. All four alternatives are considered technically feasible and do not preclude or hinder further remedial actions. The effectiveness of the remedies would be monitored via periodical groundwater monitoring. Alternative 2, 3 and 4 are expected to show high system reliability . Alternative 1 is the easiest to implement as it is not a remedial action. Alternative 2 provides ease of implementation as well as the best degree of monitoring of all the alternatives and is more administratively feasible than Alternatives 3 and 4. Alternatives 3 and 4 require numerous permits and approvals which administratively make their implementation more difficult.

7. Costs

The estimated costs of each alternative is evaluated for capital costs and operation and maintenance. Each estimate is provided in accuracy of plus 50% to a minus 30% A present worth analysis is also conducted allowing the alternatives to be compared on the basis of a single cost, which includes a 5% discount rate over five years. The highest present worth costs alternative is Alternative 4 at $1,642,000.00. The present worth costs for the other alternatives are as follows: Alternative 1 - $0; Alternative 2 - $466,147.00; Alternative 3 - $1,637,000.00.

8. State Acceptance

The State of Delaware accepts the selection of Alternative 2, monitoring of the groundwater from the Columbia and Potomac aquifers and the adjacent wetlands plus the use of institutional controls on the Columbia aquifer.

9. Community Acceptance

The community acceptance addresses those features of the alternatives that the community supports, those for which they have reservations and those for which they strongly oppose. The community has indicated its acceptance of the preferred alternative, Alternative 2 of limited action with monitoring. The public comments on the site and the selection of the alternative are included in the Responsiveness Summary of this document.

b. Summary of Comparative Analysis

Through the comparative evaluation of the alternatives, it has been determined that Alternative 1 does not provide a sufficient level of protectiveness due to its lack of monitoring and institutional controls. Therefore, it cannot be considered as the preferred alternative.

Alternative 2 provides an adequate level of protectiveness through its monitoring of groundwater and the surface waters and sediments of the adjacent wetlands as the site currently poses no risk to human health and the environment. It does not comply with the TBCs for the GPS and the groundwater, but does satisfy criteria to invoke a waiver for the TBCs. There is no remedial action which reduces toxicity, mobility and volume, however natural attenuation processes will reduce all of these. The long term and short-term effectiveness is handled easily through the control measures.

Implementation of this alternative is easiest among all of the acceptable alternatives. Its overall effectiveness is proportional to the costs making it more cost-effective than the other alternatives.

Alternative 3 satisfies the criteria of protectiveness, short and long- term effectiveness, reduction of toxicity, mobility and volume, and compliance with ARARs. To the extent that off site activities may require permits and approvals, implementation of this alternative may be more difficult, which could also result in longer time for implementation. The remedial activities could possibly disturb the wetlands during installation of the discharge line. The cost at $1,637,000 is proportional to the activity but not as cost-effective as Alternative 2.

Alternative 4 also satisfies the criteria of protectiveness, reduction of toxicity, mobility and volume, short and long- term effectiveness and compliance with ARARs. Its implementation requires fewer approvals and permits than Alternative 3 to the extent permits and approvals are required for off site activities. In addition, approval to discharge to POTW may be difficult to obtain as previous efforts have demonstrated. The cost is the highest of all alternatives and is not justified by the overall effectiveness.

X. THE SELECTED REMEDY

The remedy selected for the New Castle Spill site is limited action with monitoring of the groundwater from the Columbia and Potomac aquifers, monitoring of the surface waters and sediments of the adjacent wetlands and institutional controls restricting the installation of wells in the Columbia aquifer, in the vicinity of the site. This will be followed by a five year effectiveness review to re-evaluate the effectiveness of this remedy. The selection of this remedy is based on the following facts:

1. There are no human receptors impacted by the site since the groundwater from the Columbia aquifer is not currently being used as a potable water supply.

2. The future use of groundwater from the Columbia aquifer as a potable water supply is unlikely due to the available established supply from the Potomac aquifer and the historically poor water quality of the Columbia.

3. There are no environmental receptors adversely impacted by the site.

4. The half-life of tris can be assumed to be roughly 300 days based on the time period (1983-1988) that it took for tris to degrade from 10,100 ppm to 110 ppm and comparison to DDT, a similar aqueous structure. Using this 300 day half-life, it will take approximately 4 years for the tris in the Columbia aquifer to reach the TBC of 4.4 mg/l.

5. Tris contamination does not exist in the Potomac aquifer.

Using these five findings, it is obvious that the remedy of limited action is the most cost-effective solution that provides adequate protection to human health and the environment while effectively mitigating and minimizing the threat from the site. This remedy also utilizes a permanent solution of natural attenuation, which can be considered a treatment of the principal threat to reduce [illegible]icity, mobility and volume of the contaminants on the site. In addition, this remedy is already in place, requires no permits or

DETAILED EVALUATION OF ALTERNATIVES

Criterion	Alternative 1 No Action	Alternative 2 Monitoring	Alternative 3 Extraction Wells; Granular Activated Carbon; Discharge To Surface	Alternative 4 Extraction Wells; Discharge to POTW
Short-Term Effectiveness				
- Community Protection	Adequate	Adequate	Adequate	Adequate
- Worker Protection	Not Applicable	Adequate	Adequate	Adequate
- Environmental Impacts	None Expected	None Expected	Minor (Wetlands Disturbance)	None Expected
- Time to Remediation	Not Known - Expected to be longer than that for Alternatives 3 and 4	Not Known- Expected to be 4 Years	Not Known- (30 Years Assumed for Costing Purposes)	Not Known- (30 Years Assumed for Costing Purposes)
Long-Term Effectiveness				
- Magnitue of Remaining Risk	Acceptable, after ground water contamination dissipation/ degradation	Acceptable, after ground water contam-ination dissipation/ degradiation	Acceptable, After Ground Water Recovery and Treatment	Acceptable, After Groundwater Recovery and Treatment
- Adequacy of Controls	Not Applicable	Not Applicable	Not Applicable	Not Applicable
- Reliability of Controls	Not Applicable	Not Applicable	Not Applicable	Not Applicable
- Five-Year Effectiveness Reviews	Needed	Needed	Needed	Needed
Reduction of Toxicity, Mobility, or Volume				
- Amount of Hazardous Materials Destroyed/ Treated	Little to None	Little to None	The Majority of Tris Dissolved in the Ground Water	Little to None
- Degree of Reduction in Toxicity, Mobility, or Volume	Little to None	Through Natural Attenuation	Virtually Complete Until Carbon Column Breakthrough	Yes for Mobility; No for Toxicity and Volume (Tris not considered Biodegradable)
- Irreversibility of Reduction	Not Applicable	Through Natural Attenuation	Yes	Yes, for Mobility
- Residuals Remaining After Treatment	Not Applicable	Not Applicable	No - Spent Carbon Will be Thermally Reactivated	Not Applicable; Tris not Considered Biodegradable

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DETAILED EVALUATION OF ALTERNATIVES
(cont'd.)

Criterion	Alternative 1 No Action	Alternative 2 Monitoring	Alternative 3 Extraction Wells; Granular Activated Carbon; Discharge To Surface	Alternative 4 Extraction Wells, Discharge to POTW
Implementability				
- Technical Feasibility				
- Ability to Construct/ Operate	Not Applicable	Adequate	Adequate	Adequate
- Technical Feasibility (Cont'd.)				
- Reliability	Not Applicable	Adequate	Adequate	Adequate
- Ability to Undertake Additional Remedial Measures	Adequate	Adequate	Adequate	Adequate
- Ability to Monitor Remedy Effectiveness	Adequate (via 5-year effectiveness reviews)	Adequate	Adequate	Adequate
- Administrative Feasibility - Permit Requirements	None	None	Two Federal and Three State Permits Required	One State Permit Required
- Approvals	DNREC, EPA Approval	DNREC, EPA Approval	Conrail, DRBC, DNREC, EPA Approval	DNREC, EPA, Wilmington POTW, New Castle County Sewer System
- Availability of Services and Materials				
- Off-Site TSD Capacity	Not Needed	Not Needed	Adequate at Present	Expected to be Adequate
- Necessary Equipment and Specialists	Not Needed	Adequate	Adequate	Adequate
- Availability of Services and Materials				
- Availability of the Technology	Not Needed	Adequate	Adequate	Adequate
- Ability to Obtain Competitive Bids	Not Needed	Adequate	Adequate	Adequate
Cost				
- Capital	$0	$0	$116,000	$55,000
- O&M	$0	$25,000	$91,000	$91,000
- Present Worth (Includes 5 Year Effectiveness Reviews)	$0	$466,147	$1,637,000	$1,642,000
Compliance With ARARs	Not Applicable	Waived	Adequate	Adequate
Overall Protection of	Adequate	Adequate	Adequate	Adequate

Table 5 (cont.)

additional time to implement. Also, natural attenuation is expected to attain an equivalent standard of performance to that of the other alternatives, therefore invoking a waiver for TBCs and ARARs.

The limited action remedy addresses the groundwater contamination identified by the RI as the sole operable unit of concern at the site. The groundwater contamination was identified as the presence of tris in the shallow Columbia aquifer. Tris is a semi-volatile compound with little known data available on its human and environmental toxicity. An Acceptable Daily Intake (ADI) of health based drinking water level or "to be considered" (TBC) criteria for groundwater of 4.4 mg/l tris. This TBC has been chosen as the cleanup goal for groundwater at this site. In addition to the contamination identified in the groundwater, the aquifer has been classified as a Class II B aquifer, a potential source of drinking water.

The limited action with monitoring is a groundwater response action that First, it monitors the groundwater in the Columbia aquifer for tris on a quarterly basis until the TBC of 4.4 mg/l is achieved. The quarterly results will be reviewed and allow for a re-evaluation should an anomaly occur. Second, it monitors the groundwater of the Potomac aquifer on an annual basis for tris. Third, it monitors the surface water of the adjacent wetlands for tris on an annual basis. Any anomaly in these results would require re-sampling in the following quarter plus a trigger value of 100 ug/l of tris has been established which would require bioassay testing and further evaluation if reached. Fourth, it monitors the sediments of the adjacent wetlands for tris on an annual basis. Any anomaly in these results would require re-sampling in the following quarter plus a trigger value of 1000 ug/kg of tris has been established which would require bioassay testing and further evaluation if reached. Fifth, institutional controls will be implemented by the State of Delaware which will preclude any future installation of water wells for domestic or commercial use in the Columbia aquifer in the vicinity of the site. Sixth, a five year effectiveness review will be conducted which re-evaluates the site conditions to determine the effectiveness of the remedy. Should the remedy not achieve the anticipated results, another remedy may be selected.

XI. Statutory Determinations

To choose a remedy for a site, the statutory requirements of Section 121 of CERCLA must be satisfied. The requirements are that the remedy selected by the lead agency, in consultation with the support agency, must:

1. Be protective of human health and the environment;

2. Attain ARARs (or provide ground for invoking a waiver);

3. Be cost-effective;

4. Utilize permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable and;

5. Address whether the preference for treatment that reduces toxicity, mobility and volume as a principal element is satisfied, or provide an explanation in the Record of Decision as why it is not satisfied

Limited action of monitoring satisfies the statutory requirements of Section 121 of CERCLA through its six well designed features as demonstrated in the following discussions on statutory requirements.

Protectiveness of Human Health and the Environment

New Castle Spill Site poses no current risks to human health and the environment. The calculations for the lifetime cancer risks are approximated as zero and the Hazard Index does not exceed the recommended value of less than one. The only risk calculated for this site which exceeded EPA's recommended values is the hypothetical future use scenario for noncarcinogenic risks. The upper bound worst case hazard index for hypothetical future use is $6.68 \times 10^{+1}$. In addition, the site has demonstrated that through natural attenuation processes, the cleanup is on-going. However, to provide adequate protection to human health and the environment, several safeguards were added to monitor the mitigation and possible migration of the contaminants and prevent any future use of the groundwater of the Columbia aquifer. The first safeguard is monitoring of the groundwater from the Columbia and Potomac aquifers and the surface waters and sediments of the adjacent wetlands for tris. The monitoring will assess the degradation of contaminants in the Columbia, assure that no contamination is occurring in the Potomac and allow re-evaluation of the remedy should the degradation does not process as anticipated. In addition, trigger values were established for the surface waters and sediment which would require bioassay testing and further evaluation should these values be exceeded. The second safeguard is the use of institutional controls restricting future installation of wells in the Columbia aquifer in the vicinity of the site. This would prohibit future use of the Columbia in this area. The third safeguard is the five year effectiveness review where site conditions are re-evaluated after five years to determine the effectiveness of the remediation. Through these three safeguards and the fact that the remedy requires no remedial activity and therefore will not pose a short-term risk, or a cross media impact, the remedy will provide a more than adequate protection to human health and the environment.

Attainment of Applicable or Relevant and Appropriate Requirements

There are no contaminant specific ARARs for tris, nor action or location specific ARARs for the limited action with monitoring. In lieu of ARARs for tris, TBCs values have been established for groundwater, surface water and sediments as protective levels of cleanup for the site. These TBCs must be considered and used as appropriate, when necessary to ensure protectiveness. In addition, the U.S. EPA Groundwater Protection Strategy must be considered as a TBC for the site. A list and brief description of the TBCs associated with the preferred alternative are discussed below in greater detail.

- The TBC for groundwater of 4.4 mg/l of tris has been established as a groundwater cleanup goal for remedial activities. This was calculated from the ADI for tris of .125 mg/kg/day.

- The TBC for surface water is the current level of 42 ug/l of tris with a trigger value established at 100 ug/l which would require bioassay testing and further evaluation.

- The TBC for sediments is the current level of 402 ug/kg of tris with a trigger value established at 1000 ug/kg or 1 ppm which would require additional bioassay testing and further evaluation.

- The U.S. EPA Groundwater Protection Strategy classified the Columbia aquifer as a Class II B, a potential source of potable drinking water.

Limited action with monitoring does not provide a remedial activity which attains these TBCs. It does, however, qualify to invoke a waiver, pursuant to CERCLA Section 121 (d)(4), for these TBCs for the following reasons. Compared to the other alternatives, it provides an equivalent standard of performance through natural attenuation processes. It provides a degree of protectiveness equal to or greater than the other alternatives through its extensive monitoring activities and use of institutional controls even though the site currently poses no risks to human health and the environment. The level of performance to be achieved by natural attenuation is comparable to pump and treat alternatives. The time to achieve beneficial results is equal to the other alternatives based on the half life estimate of 4 years to achieve the TBCs. For these reasons, a waiver can be invoked for the TBCs.

Cost-Effectiveness

The limited action of monitoring has demonstrated that it protects human health and the environment and qualifies to invoke a waiver for the TBCs for the site. It has been shown that the remedy is anticipated to be completed in 4 years for the sum of $466,147. Therefore, remediation of the site could be complete by November 1992. To implement the alternatives involving pump and treat methods would take an additional one million dollars and significantly longer time to begin implementation (i.e., the spring of 1990). By this time, the limited action remedy would be half completed. By viewing all of these factors, it is obvious that the selected remedy affords overall effectiveness proportional to its costs so that the remedy represents a reasonable value for the money and is more cost-effective than Alternatives 3 and 4.

Utilization of Permanent Solutions and Alternative Technologies

The limited action with monitoring is a permanent solution to the site contamination utilizing the natural attenuation processes. It provides a greater degree of protectiveness than the other alternatives since it not only monitors the groundwater but also monitors the surface waters and sediments of the adjacent wetlands and restricts future use of the Columbia aquifer through institutional controls. In addition, it has been approximated that the cleanup will be completed by November 1992. Alternatives 3 and 4 would have hardly begun by this time. This remedy also affords overall effectiveness proportional to its costs and allows for remediation of the site to be achieved for one million dollars less than the other alternatives. In short and long- term effectiveness, the lack of remedial action and its anticipated cleanup date of November 1992 offers advantages the other alternatives cannot provide. The toxicity, mobility and volume will be reduced through natural attenuation which can be considered a treatment of the principal element and therefore satisfies a statutory preference. Both the DNREC and the U.S. EPA support this selection and feel the community will support a remedy which can achieve protectiveness and be cost-effective.

Preference for Treatment as a Principal Element

The hypothetical principal threat at this site is contamination in the groundwater of the Columbia aquifer. There is no longer a source of contamination. Natural attenuation is a process where the contaminants in the groundwater dissipate, disperse or degrade over a period of time. This can be considered a permanent solution to a problem which reduces the toxicity, mobility and volume of the contaminants even a physical treatment is not occurring. Limited action with monitoring allows a permanent solution to occur naturally.

C. RESPONSIVENESS SUMMARY

New Castle Spill Site

New Castle, Delaware

NEW CASTLE SPILL SITE
RESPONSIVENESS SUMMARY

OVERVIEW

The New Castle Spill Site entered into a public comment period on August 22, 1989 with the release of the Proposed Plan for the selection of the remedy for the site. In the Proposed Plan, the DNREC and the U.S. EPA recommended the selection of the limited action with monitoring alternative. This alternative would monitor the Columbia aquifer for tris on a quarterly basis and the Potomac aquifer and the surface water and sediments of the adjacent wetlands for tris on an annual basis. Trigger values would also be established for the surface water and sediments which would require further evaluation and bioassay testing if reached. In addition, the alternative would place institutional controls on the Columbia aquifer, precluding any future installation of wells in the Columbia aquifer in the vicinity of the site. A five year effectiveness review would re-evaluate the effectiveness of this remedy.

Public opinion on the site was received from two avenues, community interviews and comments received during the Public Meeting. In the community interviews, the general public expressed little concern about the site. In the public meeting, two contingencies expressed comments and are as follows:

o Two residents in the area of the site expressed concern over the number of cancer deaths in their neighborhood and questioned whether the deaths could be related to the spill at Witco. They were also disturbed that this spill had occurred and they had not been informed.

o Members of Board of New Castle Board of Water and Light expressed concurrence with the selection of the limited action alternative for the site but felt that the alternative should also include the sampling of the Potomac aquifer and institutional controls on the Potomac aquifer. It is the opinion of this group and its consultants that an aquifer interconnection exists in the area of the site and these additions to the alternative would allow us to monitor for any possible contamination which may occur in the Potomac aquifer.

BACKGROUND ON COMMUNITY INVOLVEMENT

The New Castle Board of Water and Light (NCBWL) formerly operated a water treatment plant on the property adjacent to the Witco facility. This treatment plant serviced the water supply from the shallow gallery water system and Potomac well located onsite. In 1977, a spill occurred at the Witco facility thereby contaminating the property of NCBWL. As result of this spill, the shallow gallery system was found to be contaminated with tris and subsequently removed from service. Because of the contamination, NCBWL decided to shut down production in the Potomac well for fear of pulling contamination down into the Potomac through pumping. It was their opinion that an interconnection exists between the Columbia and Potomac in the area of the site. A lawsuit is pending by the NCBWL against the Witco Corporation for damages to their property and source of water supply as result of the spill.

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The community has had little involvement in the past with the site. This may be attributed to their lack of knowledge of the spill and/or general community apathy. Community interviews, presentations and newspaper articles have been conducted to increase their awareness and knowledge of the site. The public has continued to appear disinterested on the site. This is clearly represented by the number of participants at the Public Meeting outside of the NCBWL contingency.

SUMMARY OF COMMENTS RECEIVED FROM THE PUBLIC COMMENT PERIOD

Several written comments were received and presented for the record at the Public Meeting on September 6, 1989. In addition, several comments were received verbally at the meeting. The transcript of this meeting is contained in the Administrative Record in the Repository in the DNREC Building at 715 Grantham Lane, New Castle, DE. The comments from this meeting together with the responses are presented below:

1. **Comment**: What is the likely scenario with regard to the TCE on the site? What has been done, what will be done and how long will it take?

Response: The TCE detected in the site has been determined to be originating from a site upgradient from the site. DNREC has recently completed a Site Inspection on the upgradient site to determine if this the origin of the TCE. The data from this Site Inspection will be evaluated through the Hazard Ranking System and receive a Hazard Ranking Score. If the score exceeds 27.5 [sic], the site will be proposed for the National Priorities List as a Superfund site. The site would then go through the same process as this site, meaning a Remedial Investigation and Feasibility Study and eventually remediation. The length of time it will take to go through this process is unknown.

2. **Comment**: What information do you have with regard to the degradation of tris ? How did you come up with the fact that it is going to eliminate itself after four years?

Response: The tris was compared to DDT for aqueous stability due to their similar structures. DDT has a half-life in water in the order of 300 days. For the tris to degrade from the 1983 sampling level of 10,100 ppm to the 1988 sampling level of 110 ppm would take 7 half-lives or roughly 2100 days (for DDT). This roughly the time interval between the two samplings. Therefore, using this comparison it can be assumed that for the tris to degrade to the cleanup level of 4.4 ppm, it will take approximately four years.

3. **Comment**: What will happen after five year if in doing the Effectiveness Review it is determined that the degradation has not reached the target level as anticipated?

Response: If the degradation is revealed in the Five Year Effectiveness Review to have not occurred as anticipated , the site would be re-evaluated for possible selection of a new remedy.

4. **Comment**: The remedy selected for this site should include sampling and institutional controls on the Potomac aquifer due to the risk presented by an aquifer interconnection.

Response: The Remedial Investigation demonstrated conclusively that an interconnection does not exist between the Columbia and Potomac aquifer in the area of the site. For this reasons, it is unnecessary to either sample or

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place institutional controls on the Potomac aquifer. However, as the public has expressed concern over the possible risk to the Potomac, sampling will be conducted on the Potomac on an annual basis as a safeguard. It is DNREC and EPA's opinion that the placement of institutional controls on the Potomac is unwarranted.

5. **Comment**: Can the tris spilled be related to the number of cancer deaths in neighborhood located adjacent to the site?

Response: Tris has been found to be a noncarcinogen. Therefore, the cancer deaths cannot be attributed to the presence of tris in the groundwater. In addition, the groundwater is not currently being used as a potable supply and has not been used since the detection of tris, which was immediately after the spill.

6. **Comment**: Experts outside of the U.S. EPA feel that tris is a carcinogen.

Response: The U.S. EPA has concluded through their review of toxicological data on tris that it is not a carcinogen. The data used to make this determination and their basis for this conclusion can be found in the Administrative Record located in the Repository at the DNREC Building.

7. **Comment**: Why are there two opinions on the carcinogenicity of tris? Is there a concrete method of determinating whether this compound is carcinogenic?

Response: Animal tests where animals are subjected to high doses of the compound are used to determine carcinogenicity of a compound. The test results are then extrapolated to humans with difficulty due to the difference of high to low dose exposure and interspecies extrapolation. Experts may interpret the results differently and draw opposing conclusions.

STATE OF DELAWARE
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September 27, 1989

Mr. Edwin B. Erickson
Regional Administrator
U.S. EPA Region III
841 Chestnut Street
Philadelphia, PA 19114

Subject: Declaration of the Record of Decision for the New Castle Spill Site

Dear Mr. Erickson:

As per Multisite Cooperative Agreement V-003374-01, the State of Delaware Department of Natural Resources and Environmental Control (DNREC), CERCLA Management Branch, has completed the Record of Decision (ROD) for the New Castle Spill Site.

Through the coordinated efforts of DNREC and EPA, the Department believes an appropriate remedy for the site has been selected. By signature of the Declaration of the ROD, DNREC has formally expressed its support of the selected remedy.

In order to finalize the New Castle Spill Site ROD, we are now requesting EPA's signature on the Declaration of the ROD.

Sincerely,

Philip G. Retallick
Director

PGR/DPD/dpd
DPD2169

Attachment

cc. E.H. Clark, II
G.A. Molchan
J.J Hardman
G.B. Chadwick
D.P. Dewsbury